

## Claims

- [c1] 1. An x-ray tube window cooling assembly for an x-ray tube comprising:  
an electron collector body coupled to an x-ray tube window and having a first  
coolant circuit comprising;  
a coolant inlet and a coolant outlet, said coolant outlet directing coolant at an  
x-ray tube window surface to impinge upon and cool the x-ray tube window.
- [c2] 2. An assembly as in claim 1 wherein said coolant outlet in directing coolant at  
said x-ray tube window directs said coolant at and reflects said coolant off of a  
reflection surface on the x-ray tube, opposite that of said x-ray tube window  
surface and impinges said coolant upon said x-ray tube window surface.
- [c3] 3. An assembly as in claim 2 wherein said reflection surface is an inner side of  
an x-ray tube casing.
- [c4] 4. An assembly as in claim 3 wherein said inner side is a portion of an x-ray  
transmissive device.
- [c5] 5. An assembly as in claim 1 wherein said electron collector body further  
comprises a fin pocket.
- [c6] 6. An assembly as in claim 5 wherein said fin pocket comprises a plurality of  
lanced offset cooling fins or extended cooling surfaces.
- [c7] 7. An assembly as in claim 5 wherein said fin pocket is coupled to a single wall  
of said electron collector body.
- [c8] 8. An assembly as in claim 1 wherein cross-sectional area of an opening of said  
coolant outlet is smaller relative to cross-sectional area of said fin pocket,  
perpendicular to direction of coolant flow.
- [c9] 9. An assembly as in claim 1 wherein opening width of said coolant outlet is  
approximately equal to width of the x-ray tube window.
- [c10] 10. An assembly as in claim 1 further comprising a second coolant circuit  
comprising an auxiliary coolant jet directing coolant flow across said x-ray tube  
window surface.

- [c11] 11. An assembly as in claim 1 wherein said electron collector body comprises an oil side and a vacuum side, said oil side comprising said coolant inlet and said coolant outlet.
- [c12] 12. An assembly as in claim 1 further comprising a guide coupled to said electron collector body and directing coolant at said reflection surface as to impinge upon and cool the x-ray tube window.
- [c13] 13. An x-ray tube comprising:  
a housing unit;  
a cathode coupled within said housing unit and generating an electron beam;  
an anode coupled within said housing unit and receiving said electron beam and generating x-rays that are directed through an x-ray tube window; and  
an x-ray tube window cooling assembly comprising;  
an electron collector body coupled to said x-ray tube window and having a first coolant circuit comprising;  
a coolant inlet and a coolant outlet, said coolant outlet directing coolant at a reflection surface on the x-ray tube, opposite that of an x-ray tube window surface, to reflect said coolant off said reflection surface as to impinge upon and cool said x-ray tube window.
- [c14] 14. An x-ray tube as in claim 13 wherein said x-ray tube window cooling assembly is interposed between said cathode and said anode.
- [c15] 15. An x-ray tube as in claim 13 wherein said electron collector body further comprises a fin pocket coupled to a single side of said electron collector body.
- [c16] 16. An x-ray tube as in claim 13 wherein cross-sectional area of an opening of said coolant outlet is smaller relative to cross-sectional area of said fin pocket, perpendicular to direction of coolant flow.
- [c17] 17. An x-ray tube as in claim 13 wherein opening width of said coolant outlet is approximately equal to width of the x-ray tube window.
- [c18] 18. An x-ray tube as in claim 13 further comprising a second coolant circuit comprising an auxiliary coolant jet directing coolant flow across said x-ray tube

window surface.

- [c19] 19. A method of operating an x-ray generating device comprising:
- generating an electron beam;
  - directing said electron beam at impinge upon an anode target to generate x-rays;
  - directing said x-rays through an x-ray tube window increasing temperature of the x-ray tube window; and
  - directing coolant at a reflection surface on the x-ray tube, opposite that of an x-ray tube window surface, to reflect said coolant off said reflection surface as to impinge upon and cool the x-ray tube window, via a first cooling circuit.
- [c20] 20. A method as in claim 19 further comprising directing additional coolant across said x-ray tube window surface via a second cooling circuit.